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Do Technology-Based Support Groups Reduce Care Burden Among Dementia Caregivers? A Review

Eunyoung Lee

College of Social Work, Florida State University, Tallahassee, Florida, USA

Technology-based support groups for caregivers are often more accessible and convenient than attending face-to-face support groups. In this review the author examines the effectiveness of technology-based social support groups on reducing care burden among caregivers of individuals with dementia. Studies were identified through 10 online bibliographic databases. Inclusion criteria: (a) published before June 2013, (b) rigorous study design, (c) English language, (d) peer-reviewed journals, (e) home-based care, (f) telephone and/or Internet support group utilized at home, and (g) outcome measure of care burden or caregiver stress. Technology-based social support groups enjoy a modest level of positive outcomes, appear to be low cost, and pose little risk of harmful effects while reducing care burden in caregivers. Based on the five studies reviewed, technology-based support group services have demonstrated a positive impact on reducing care burden among dementia caregivers; and improve support networks similarly to the way face-to-face support groups connect participants.

Keywords: Dementia caregiver, social support group, technology, care burden, narrative review

Over 7.4 million individuals are suffering from dementia in the United States. At the current rate of diagnosis, every 20 years the number of individuals with dementia is expected to double (Brodaty & Donkin, 2009; World Health Organization, 2012). Caregivers of patients with dementia offer physical assistance with activities of daily living and mental support, as well as managing financial issues (Marziali & Garcia, 2011). However, it is not easy to provide care for a person with dementia because the progression of the illness in the patient requires increasing levels of care from the caregiver. In addition, care recipients with dementia demonstrate inappropriate behaviors that may lead caregivers to feel overwhelmed by their care burden (Mahoney, Tarlow, & Jones, 2003). Care burden is defined by George and Gwyther (1986) as ongoing problems with providing care for relatives with dementia, including emotional, physical, and mental consequences for the caregivers.

Dementia caregivers have heavy responsibilities in taking care of patients when compared to the caregivers of persons with other diseases (Alzheimer's Association and National Alliance for Caregiving, 2004). Researchers indicate that the primary caregivers with these responsibilities are family members, such as a spouse or adult children (Ott, Sanders, & Kelber, 2007; Werner, Mittelman, Goldstein, & Heinik, 2012). In many cases, these individuals provide care for care recipients with dementia at home rather than having their care recipients institutionalized. Caregivers may confront emotional, physical, psychosocial, and financial demands in their lives while caring for patients with dementia. Some caregivers are having difficulties dealing with many of these issues by themselves. These difficulties frequently lead caregivers to feel care burden (Werner et al., 2012).

The most serious issue is the lack of help and support that caregivers face (Brummett et al., 2006). Caregivers tend to overlook their personal lives because they have to spend a lot of time caring for patients with dementia. Furthermore, caregivers tend to experience reduced social networking opportunities and have less time for personal activities. For this reason, they have more care burden and higher levels of depression than non-caregivers (Pinquart & Sorensen, 2003). To keep providing care for patients with dementia and reduce care burden for caregivers, caregivers need social support from their family members or outside resources.

Many community centers provide various services such as emotional and psychological interventions for caregivers (Gallagher-Thompson et al., 2012). A number of different interventions have been developed to increase caregiver social support. One of the major services provided is caregiver support groups. Social support groups have a positive influence on many difficulties such as care burden, depression, social isolation, and lack of caring knowledge among dementia caregivers (Schulz et al., 2002). Face-to-face social support groups usually have meetings in community centers or other clinical settings. These social support groups allow the caregivers to expand their social networks while interacting with others who have similar roles and experiences (Shaw, McTavish, Hawkins, Gustafson, & Pingree, 2000). In addition, caregivers can build coping strategies through others' experiences and through intervention programs.

Despite various benefits for caregivers, attending face-to-face caregiver support groups can be a challenge. Due to transportation issues, caregivers who live in rural areas might find it more difficult to attend support meetings than caregivers who live in metropolitan areas. Meeting attendance may also depend on the care recipient's situation; for example, if the care recipient's doctor's appointment conflicts with the support group meeting time, the caregiver may not be able to attend the meeting. It may be difficult for caregivers to attend the support group meetings if they do not have respite care. Caregivers may also have trouble sharing their feelings with others because they are afraid of being judged by other group members (Golden & Lund, 2009). Some of these limitations may be overcome by participating in support group meetings via technological means, such as by the telephone or over the Internet.

Technological advances, such as telephones and the Internet, enable people to more readily access information. Support groups using these technologies have the potential to expand the network of available services. Technology-based support groups for dementia caregivers are often more accessible and convenient than physically attending support groups meeting at a community center. Caregivers tend to have difficulty attending programs because of limited time, long distance, or difficulty finding respite care (Winter & Gitlin, 2007). However, by using a telephone conference call or the Internet, they can more easily attend caregiver meetings, receive counseling, and obtain information about community resources at home while caring for their care recipients (Hanson et al., 2007). Furthermore, technology-based support groups help decrease isolation and preserve caregivers' privacy (Smith, Toseland, Rizzo, & Zinoman, 2004).

Since 1970, telephone support groups have been used among diverse populations to provide services (Goelitz, 2003; Schopler, Abell, & Galinsky, 1998). Telephone support groups include three components: emotional-focused coping, problem-solving coping, and support (Smith et al., 2004). Telephone support groups focus on caregivers' emotional moods, family functioning, caregiving skills training, and social support (Smith et al., 2004; Winter & Gitlin, 2007). Telephone support groups often range from 8 to 14 weekly sessions. For example, Telephone Linked Care (TLC) is an 18 month program which includes four interventions: "Monitoring and counseling, In-home support group, Ask the expert, and Activity/Caregiver respite conversation" (Mahoney, Tarlow, Jones, Tennstedt, & Kasten, 2001, p. 140). However, telephone support groups have difficulties facilitating interactions with group members because of the lack of face-to-face interaction (Goelitz, 2003).

Since Internet support groups emerged in 1990, many social service providers have conveyed information to dementia caregivers via the Internet (Hanson et al., 2007). Internet support groups

can provide various interventions such as web-based education workshops, online videoconferences, caregiving information, and individual counseling services via e-mail (Chiu et al., 2009; Marziali & Donahue, 2006). Through Internet support groups, dementia caregivers may experience reduced levels of stress and burden (Chiu et al., 2009). However, the Internet is not as widely used as an intervention for caregivers compared to telephone support groups. Even though many people currently access the Internet in daily life, caregivers who are over 60 years old might find it easier to use the telephone or attend a program face-to-face than to use the Internet to obtain support. Internet support groups may have varying results in terms of helping care burden, depending on the caregiver's individual circumstances.

According to Mahone, Tarlow, and Jones, social services providers began using a combination of telephones and the Internet as a vehicle for dementia caregiver support groups over a decade ago (2003). This mixed modality intervention typically lasts from 6 to 12 months (Hanson et al., 2007). One example is the Computer-Telephone Integration System (CTIS) provided by Finkel and colleagues (2007) for family caregivers of dementia patients. The intervention consisted of 14 sessions. They provided individual educational skills for eight sessions, and support group sessions for six sessions. Participants experienced reduced care burden as well as reduced symptoms of depression.

It is important to assess the impact of technology-based support groups on care burden among dementia caregivers. Increasingly, service providers are using technology to provide resources to caregivers. Through this technology, caregivers can receive the necessary services anywhere. Recently, Powell, Chiu, and Eysenbach (2008) did a systematic review of the effectiveness of networked technologies as an intervention in supporting dementia caregivers. In their review, they focus on various outcomes including career health status, quality of life, burden, satisfaction, and more. Even though the authors focus on many outcomes regarding caregivers in their study, they did not provide sufficient information that specifically addresses how technology-based dementia support groups help relieve caregiver's burden. In addition, they excluded telephone-only intervention from their study. However, elderly caregivers are often unfamiliar with using computers rather than telephones. If the study only provides social support for dementia caregivers via the Internet, some caregivers might have difficulty participating in the study. From this perspective, we should consider the importance of using technologies that the client prefers in offering support to caregivers of patients with dementia. The current study chose to provide caregiver support groups through the telephone, the Internet, or both. Furthermore, Powell and colleagues (2008) remarked that the study was published before August 2007, while the current study includes research published in the five years after 2007, therefore the current study has more updated information regarding relationships between technology-based dementia support groups and caregiver burden. Currently, there are no systematic reviews which specifically focus on evaluating the relationship between technology-based support groups and care burden for caregivers of individuals with dementia. This is a topic with wide-reaching effects as many social workers and behavioral and mental health clinicians provide direct services for caregivers of individuals with dementia. This review will be helpful for service providers in conducting technology-based support groups for dementia caregivers. The primary objective of the author in this review is to examine experimental, quasi-experimental, and quantitative outcome studies of technology-based support groups for caregivers to determine if technology-based support services are effective in reducing care burden among dementia caregivers.

METHODS

Studies were identified through online bibliographic databases including: Biological Sciences, PsycINFO, MEDLINE, Social Services Abstracts, Applied Social Sciences Index and Abstract

(ASSIA), ERIC, Social Logical Abstracts, Neurosciences Abstracts, Environmental Sciences and Pollution Management, and ProQuest. The search terms used to guide the database searches included the following: “caregivers” OR “dementia caregivers” OR “Alzheimer’s caregivers” AND “support group” OR “Internet support groups” OR “Telephone support groups” AND “care burden” OR “outcome” OR “technology” OR “intervention.” These keywords were searched for in the abstract fields.

Several inclusion and exclusion criteria were utilized for this review: (a) the study was published before June 2013, (b) the research design was more rigorous than a case study (e.g., time series interrupted design or randomized control trials). Mixed methods studies that utilized qualitative methods to supplement quantitative findings were included in the review. However, only the quantitative results were addressed from these studies. Further, (c) the study was published in a peer-reviewed journals, (d) the study was written in English, (e) study participants were caregivers of patients with dementia within their own home, (f) participants received services at home through either telephone, Internet support group, or both, and (g) the outcome measure was care burden or caregiver stress. Caregiver stress was included because it is a component of care burden. According to Meltzer, Ford, Goodman, and Vostanis (2011), “subjective [care] burden is the extent to which the caregiver perceives care responsibilities to be stressful” (p. 1). With regards to the consequences for the caregivers and the burden placed on the caregivers, care burden is equivalent to caregiver stress. After considering their respective perspectives, the author has defined care burden for this current study as the extent to which the caregivers feel physical, emotional, and mental burden while caring for a care recipient with dementia.

The following exclusion criteria were applied: (a) the study appeared in the gray literature, (b) participants took care of patients with dementia in institutional settings, and (c) the study was purely qualitative or employed case study methodology. Purely quantitative studies were excluded due to the wide variety of methods employed as well as the range of outcome variables addressed.

A total of 111 articles were identified as potential studies for the review based on the key words input into the search. The studies were first examined for relevance based on the document title, with 76 being excluded on this basis. The remaining 35 articles were examined for relevance based on their abstracts, resulting in 25 further exclusions. The full-texts of the remaining 10 articles were reviewed for relevance. Five articles were excluded on the basis of the full-text review, leaving a total of five studies which fit the parameters of this review (see Figure 1).

RESULTS

Study Characteristics

The studies reviewed included telephone support groups (Nichols, Martindale-Adams, Burns, Graney, & Zuber, 2011), Internet-based support groups (Chiu et al., 2009; Marziali & Donahue, 2006; Marziali & Garcia, 2011), and mixed modes such as both Internet and telephone support groups (Mahoney et al., 2003). All of the participants were dementia caregivers in either the United States or in Canada. In this review, the outcome measure of technology-based support groups was either care burden or caregiver stress. An overview of the five studies reviewed is showed in Table 1.

Study Outcomes

Mahoney and colleagues (2003)

The Mahoney and colleagues (2003) study examined whether or not a computer-mediated automated interactive voice response (IVR) intervention positively impacted care burden and

anxiety among Alzheimer's caregivers. The study population consisted of a sample of 100 caregivers (mean age = 62). Participants were randomly divided into two groups: One group of 49 participants had IVR-mediated interventions. As the control group, 51 participants received standard, non-IVR-mediated care.

The multisystem telecommunications consisted of an integrated telephone network system and an IVR computer network system. With this system, intervention consisted of four types: weekly caregiver's conversation, personal mailbox, bulletin board, and activity-respite conversation. The participants would access a password-protected intervention system. With the telephone network system, participants used a personal mailbox and bulletin board. On the other hand, with the IVR computer network system, they also used the weekly caregiver conversation and the care recipient distraction call. "The intervention was available for 22 hours a day, except for 2 hours during the night for network file backup" (p. 558).

Data were collected four times: at pre-intervention, at 6-month follow up, at 12-month follow up, and at 19 month follow up, using the Revised Memory and Behavior Problems Checklist

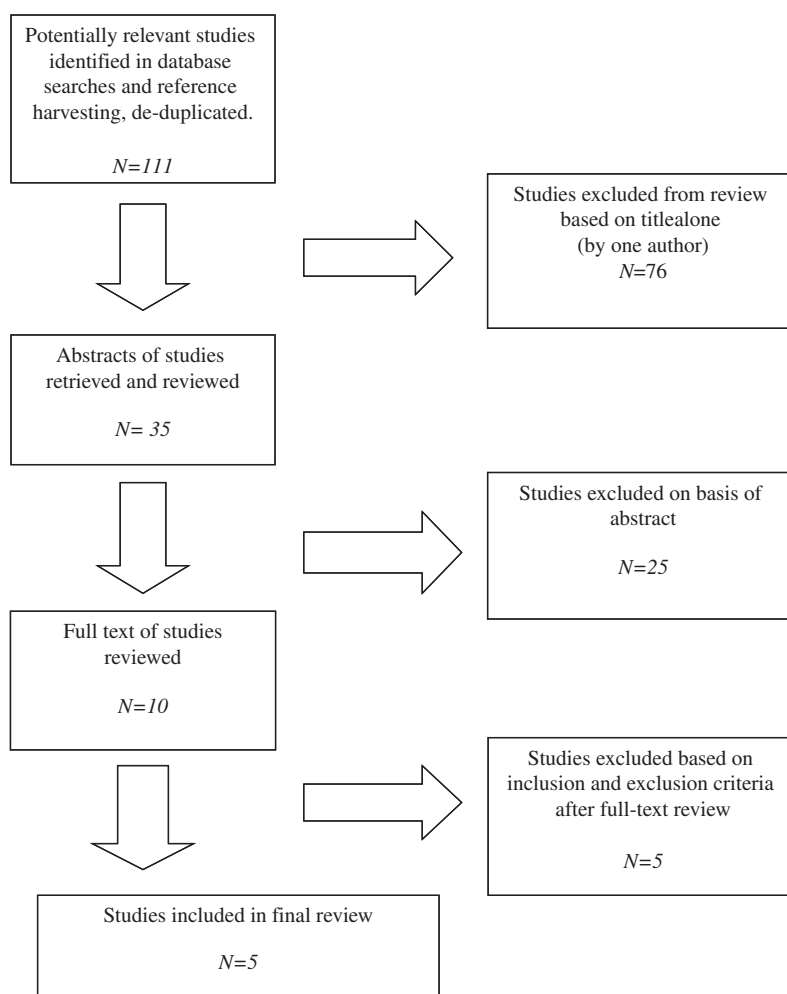


FIGURE 1 QUORUM flowchart indicating screening process for inclusion and exclusion of studies from the review.

TABLE 1
Evaluative Studies of Technology-Based Support Groups for Caregivers of Patients with Dementia

Study	Interventions	Study Population	Designs	Measures	Results
Mahoney, Tarlow, & Jones (2003)	Computer-mediated automated interactive voice response (IVR) vs. usual care	Alzheimer's caregivers (n = 100)	ROXOOO ROOOO	<ul style="list-style-type: none">• The Revised Memory and Behavior Problems Checklist (RMBPC)• Epidemiological Studies Depression Scale (CES-D)• The State Anxiety Inventory (STAI).• By focusing on bothersome behavior, depression, and anxiety, caregiving stress was measured.• Caregiver stress was measured in relation to care receivers' troubles dealing with activities of daily living (ADLs) and instrumental ADLs (IADLs).	Results from the control group and the intervention group reveal that the intervention did not significantly reduce caregiver burden in general. However, caregivers with lower levels of caregiving mastery do experience a significant reduction in caregiver burden from intervention when compared to caregivers with higher caregiving mastery. Furthermore, caregiving wives of Alzheimer's patients also experienced a reduction in caregiver burden from the IVR interventions.
Marziali & Donahue (2006)	The Internet-based intervention group vs. no intervention group.	Alzheimer's, Stroke-related Dementia caregivers and Parkinson's caregivers (n = 66)	ROXO ROO		Between the baseline and the 6-month follow up, participants who received intervention experienced greater reduction in stress levels compared to the control group.
Chiu et al. (2009)	The Internet-based caregiver support service (ICSS)	Dementia caregivers (n = 28)	OXO	<ul style="list-style-type: none">• The Burden Scale for Family Caregivers (BSFC)	In a pre- and a post-test, "care burden chance score was not statistically significant among participants" (p. 328). At the post-intervention, frequent users (n = 10) reduced their care burden score. Occasional users (n = 8) also reduced their care burden score, however, the reduction was not statistically significant. In comparison, at the post-intervention, non-user groups (n = 9) showed that care burden scores had increased. Care burden scores were associated with memory behavior, depression, positive aspects of care, and caregiver competence.

(Continued)

TABLE 1 – continued

<i>Study</i>	<i>Interventions</i>	<i>Study Population</i>	<i>Designs</i>	<i>Measures</i>	<i>Results</i>
Marziali & Garcia (2011)	The Internet-based chat support group vs. The Internet-based video conferencing support group	Dementia caregivers (n = 91)	OXO OXO	<ul style="list-style-type: none">• The Functional Autonomy Measurements System (SMAF). The SMAF was adapted to assess of caregiver stress	In the Chat-Group, there were no changes between pre- and post-test. Among the video group, there was a pre and post-test improvement in self-efficacy, social support, and personality, which correlated with a lower stress response in the caregivers.
Nichols, Martindale-Adams, Burns, Graney, & Zuber (2011)	<ul style="list-style-type: none">• Individual home session• Individual telephone session• Telephone support groups session	Alzheimer's disease or related dementia caregivers (n = 127)	OXO	<ul style="list-style-type: none">• The Zarit Burden Interview	When comparing baseline to follow up, decreased care burden, depression have a positive influence on caregivers depression on daily lives, caregiving frustration. Furthermore, the number of "troubling dementia-related behaviors" (p. 353) was significantly improved.

(RMBPCP: Teri et al., 1992) to assess problem behavior, depression which was measured by the Center for Epidemiological Studies Depression scale (CES-D: Radloff, 1977), and anxiety which was measured by the State Anxiety Inventory (STAI: Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1985). To be specific, the authors indicate that “the RMBPC’s Bother scale contained questions that asked how much potential disruptive behaviors might bother the caregiver” (p. 560). In addition, many researchers importantly consider anxiety and depression as a part of the care burden (Grunfeld et al., 2004; Schoenmakers, Buntinx, & Delepeleire, 2010). For these reasons, these three measures were considered reflective of overall caregiver burden.

Results from the control group and the intervention group reveal that the intervention did not significantly reduce caregiver burden in general. However, caregivers with lower levels of caregiving mastery do experience a significant reduction in caregiver burden from intervention when compared to caregivers with higher caregiving mastery. Furthermore, caregiving wives of Alzheimer’s patients also experienced a reduction in caregiver burden from the IVR interventions. Limitations of this study include the following: (a) caregivers were allowed to choose according to their preferences from four modules of intervention. As such, the intensity of the intervention might differ among the participants based on their individual preferences, which would impact the overall results of the study. (b) Analysis of the study’s outcomes was limited by small sample size.

Marziali and Donahue (2006)

The Marziali and Donahue (2006) study evaluated how the Internet video-conferencing group intervention affects family caregivers of older adults with neurodegenerative diseases such as Alzheimer’s, stroke-related dementia, and Parkinson’s. The study population consisted of a sample of 66 family caregivers (mean age = 67.8). Based on each disease, participants were assigned into two groups: Internet-based intervention group or no intervention group. Subsequently, among the intervention groups, 4 to 6 members were sorted into disease-specific caregiver groups. Computers and training were provided to the intervention groups so that they would access a password-protected website for e-mail, information, and a forum-style discussion. The group members had video conferencing for 10 sessions. After finishing all sessions, the group members had an additional 12 online sessions.

Data were collected twice, pre-intervention and at 6-month follow up. Pre- and post-outcome measurements included general health, depression, stress response to care receivers’ troubles dealing with activities of daily living (ADLs), instrumental activities of daily living (IADLs) independently, difficult behaviors, and social support among all participants. Specifically, caregiver stress was measured in relation to care receivers’ troubles dealing with ADLs and IADLs (Finch, 1995) that were done for the benefit of the care recipient. The current study required participants to rate their degrees of stress on a 3-point scale of severity for each endorsed ADL and IADL.

Results revealed that between the baseline and the 6-month follow up, participants who received intervention experienced greater reduction in stress levels compared to the control group. Limitations of this study include the following: (a) 28 of 66 original participants dropped out prior to the 6 month follow up, and of the 28 drop outs, 18 were from the control group. This significant attrition rate, especially among the control group, limits the study’s power of analysis. (b) Even though the authors divided caregivers into three groups of disease-specific cohorts, they did not provide any explanation about the difference or similarity of stress levels among the three disease-specific groups. The authors seem to have missed an opportunity to look at disease-specific intervention impacts.

Chiu and colleagues (2009)

The Chiu and colleagues (2009) study examined how an Internet-based caregiver support service (ICSS) impacted health outcomes among Chinese Canadians who took care of a family member

with dementia. The study population consisted of a sample of 28 caregivers. All of the participants received online support services. The ICSS provided two major services: a caregiver information handbook, and the personalized e-mail therapeutic intervention.

Through accessing the website, caregivers received an information handbook which consisted of disease identification and progression, caregiving techniques, and a listing of community resources. This information was made by social workers as well as occupational therapists. For Chinese participants, the information also was translated into simplified Chinese and traditional Chinese language. An English language text was also provided on the website.

The personalized e-mail therapeutic intervention was provided to the caregiver participants so that they would access a password-protected website. Two experienced clinicians conducted this intervention, and participants were randomly divided among each of these clinicians. The purpose of the intervention was to build relationships, as well as to share caregiver concerns with the therapists. The therapists also provided emotional support and “information about the disease and its management” (p. 325).

Data were collected twice, at pre-intervention and at the termination of the program. Pre and post outcome measurements included care burden, memory and behavior problems, depression, the self-rated health, social support, the positive aspect of caregiving, the OARS Multidimensional functional, and the caregiver competence. Specifically, care burden was measured through the 28-item burden scale for family caregivers (BSFC: Grasel, Chiu, & Oliver, 2003). For Chinese participants, the measurement was translated.

After the authors obtained the data, the participants divided into three ICSS user groups: non-user, occasional users (1 to 2 times), and frequent users (3 or more times). Based on each group, the author analyzed the data using BSFC as the primary measure. The results showed that in a pre- and a post-test, “care burden chance score was not statistically significant among participants” (p. 328). At the post-intervention, frequent users ($n = 10$) reduced their care burden score. Occasional users ($n = 8$) also reduced their care burden score, however, the reduction was not statistically significant. In comparison, at the post-intervention, non-user groups ($n = 9$) showed that care burden scores had increased. Care burden scores using the BSFC were associated with memory behavior, depression, positive aspects of care, and caregiver competence.

Limitations of this study include the following: (a) The authors did not provide specific information about spousal caregivers. To be specific, among participants, all spousal caregivers declined the use of the e-mail support service so that the authors obtained results from only the children or the grandchildren of family members with dementia. (b) The results of the study could not be generalized because the study involved only one specific agency in Toronto which served Cantonese speakers, so the results were not applicable to the Mandarin-speaking population. (c) The authors did not mention the length of caregivers’ participation in the intervention, which makes it difficult to replicate the study. It also prevents others from using the results of the study to help reduce other caregivers’ burdens.

Marziali and Garcia (2011)

The Marziali and Garcia (2011) study examined whether or not two Internet-based intervention programs impact stress and health status among dementia caregivers. The study population consisted of a sample of 91 caregivers (mean age = 65.51). Participants were divided into two groups: one group ($n = 40$) received an Internet-based chat support group and the other group ($n = 51$) was the Internet-based video conferencing support group.

The aim of the researchers for the chat group was to engage with others who took care of individuals with dementia and received reciprocal supports. The chat group participants received the dementia caregiver information and 6 dementia care educational videos which were made available at all times on the website for 6 months. At the start of the program, a clinical moderator

facilitated the introduction of the participants to each other so that they would share their experiences with other participants taking care of individuals with dementia. The chat forum received monthly moderation by a clinician in order to support participants.

The purpose of the video conferencing group was that dementia caregivers obtain psychotherapeutic support group intervention. Through the video conferencing, dementia caregivers could receive the benefits of face-to-face support. Through the website, six caregiver groups, either spouses or adult children, had weekly online meetings for 1 hour during 10 weeks supervised by health professional therapists, such as 2 nurses and 1 social worker. Subsequent to these sessions with the health professional interventionists, the groups met for an additional 10 weekly sessions without the assistance of health professionals, with one of the group members overseeing the technical aspects of the video-conferencing meetings.

Data were collected twice: pre-intervention and 6 months after receiving the intervention. Pre- and post-outcome measures for both chat support groups and video conferencing support groups included caregiver health, depressive symptoms, and caregiving distress. Specifically, by using the Functional Autonomy Measurements System (SMAF: Hébert, Durand, & Dobuc, 2003), caregiving stress was measured. The SMAF was adapted to assess of caregiver stress. For example, the participants were asked to rate the degree of distress perceived while providing care for care receivers. To analyze the data, they used two methods: quantitative and qualitative. However, only quantitative results were within the scope of this review.

Results indicate that the authors compared Internet-based chat support groups and Internet-based video conferencing support groups, and found in the Chat-Group, there were no changes between pre- and post-test. Among the video group there was a pre- and post-test improvement in self-efficacy, social support, and personality, which correlated with a lower stress response in the caregivers. Limitations of this study include the following: (a) The authors did not provide explanations about why caregivers in the chat group did not have significant changes in their distress response domains for the pre- and post-tests. (b) One of the objectives of the study was to examine caregivers' health status through the Internet based intervention program. However, there was no data as to whether these interventions were associated with a reduction in the caregivers' use of health services or institutions.

Nichols and colleagues (2011)

The Nichols and colleagues (2011) study examined whether or not a proven behavioral intervention can transform the clinical practice across multiple facilities with different levels of staff delivering the intervention among dementia caregivers. "REACH VA (Department of Veterans Affairs) was the first national clinical translation of a proven behavioral intervention for dementia caregivers" (p. 353). Data for the study were obtained with the National Institute on Aging/National Institute of Nursing Research Resources for Enhancing Alzheimer's Caregiver Health (REACH: Schulz et al., 2003) using a randomized controlled trial (REACH II: Nichols et al., 2008). The study population consisted of a sample of 127 caregivers (mean age = 71.6). The participants received three interventions including 9 individual home sessions of 1 hour, 3 individual telephone sessions for 30 minutes each, and 5 monthly telephone support group sessions of 1 hour each.

The structured telephone support groups which consisted of 5 or 6 caregivers, received social support, education, and various resources from the interventionist. During these sessions, caregivers took assessments facilitated by the interventionist. To conduct this program, the VAMC investigators provided REACH II manuals for program facilitators, as well as caregiver notebooks. In addition, REACH II used computer assisted screen telephones, and provided additional services by interventionists for helping caregivers who had issues. Risk assessment was well-conducted in REACH II when compared to REACH VA.

Data were collected twice: pre-intervention and at 6 months after receiving the intervention. Specifically, pre- and post-outcome measures for caregiver participants included care burden, depression, health and healthy behaviors, caregiving frustrations, social support, and dementia-related behavior. Care burden was measured using the Zarit Burden Interview (Bédard, et al., 2001; Zarit, Reever, & Bach-Peterson, 1980). The data analysis only utilized quantitative methods.

Results showed that when comparing baseline to follow up, decreased care burden and depression have a positive influence on caregivers “depression on daily lives, caregiving frustration. Furthermore, the number of ‘troubling dementia-related behaviors’” (p. 353) was significantly improved. Limitations of this study include the following: (a) the sample size was small so that the results of the study could not be generalized. (b) Follow-up data collection was obtained via a phone survey which lasted 30 minutes. This appears to be double the time of the suggested length of a phone survey; many researchers suggest a maximum of 15 minutes for a phone survey because otherwise respondents might not fully answer all the questions while taking the survey. (c) Many interventionists had repeated training sessions as a result of staff turnover. (d) The researchers did not consider patient care cost due to the long processing time involved in VA projects.

DISCUSSION AND APPLICATION TO PRACTICE

Dementia has a negative impact on caregivers as well as care recipients. Most caregivers take care of care recipients with dementia at home instead of placing them in institutions. Many programs and services have been aiding dementia caregivers by utilizing social support groups to reduce care burden (Chiu et al., 2009; Nichols et al., 2011). Most social support groups are provided face-to-face. However, transportation problems and difficulty finding respite care may prevent caregivers from attending face-to-face social support groups. Technology-based social support groups attempt to circumvent this problem by providing the social support groups in the caregiver’s home (via technology). The purpose of the author in this review is to examine the effectiveness of technology-based social support groups at reducing care burden among dementia caregivers.

The five studies reviewed support the effectiveness of technology-based social support groups on reducing care burden among caregivers of care recipients with dementia. Most of the participants were dementia caregivers in either the United States or Canada. These five studies were conducted using quasi-experimental and experimental designs. In these five studies, the sample sizes ranged from 28 to 127 caregivers. In addition, the outcome measure of technology-based support groups was care burden (Chiu et al., 2009; Nichols et al., 2011) or caregiver stress (Mahoney et al., 2003; Marziali & Donahue, 2006; Marziali & Garcia, 2011). Three of the five studies utilized Internet support (Chiu et al., 2009; Marziali & Donahue, 2006; Marziali & Garcia, 2011). One of the five studies used telephone support (Nichols et al., 2011) and one of the five studies used both Internet and telephone support (Mahoney et al., 2003).

The outcomes of all five studies demonstrated that technology-based social support groups reduced care burden among dementia caregivers. It should be noted that in the Chiu and colleagues (2009) study, ICSS had positive effects on reducing care burden among participants in the groups which utilized the technology-based social support group frequently. However, compared to frequent users, the less frequent users experienced less of a reduction in care burden. Furthermore, Marziali and Garcia (2011) demonstrated that video conferencing interventions were more helpful for dementia caregivers than the chat group interventions. The video conferencing allowed face-to-face support, thereby increasing effectiveness.

Among the five studies reviewed, the Chiu and colleagues (2009) study was the only one which provided bilingual services for participants in an effort to facilitate the intervention for immigrant dementia caregivers. It is very important to provide bilingual support services for dementia

caregivers to allow for more effective communication. Chiu and colleagues (2009) are already implementing changes and improvements to the current model of technology-based support groups by including bilingual services. Technology-based support groups may be beneficial for immigrant caregivers to make connections with others as well as to access existing information regarding caregiving. This may enable caregivers of various races and ethnicities to receive social support which they might not otherwise receive.

Attrition was a significant factor in two of the studies. First, participants in the Marziali and Donahue study (2006) were divided into two groups: intervention and control. Among these groups, 28 of the 66 participants dropped out prior to the post-test 6 months later. Eighteen of those were in the control group. It is possible that attrition in the control group was due to lack of services. In addition, the Nichols and colleagues (2011) study showed that 22.8% of participants did not complete the post-test due to placement, attrition, or inability to contact the participants after the intervention. The attrition in the two studies was likely not due to transportation issues, since the interventions took place in the participants' homes.

One concern in the use of technology support groups is the feasibility of use for older spousal caregivers. Chiu and colleagues (2009) show that all spousal caregivers declined the use of the e-mail support services; the authors obtained results only from the children or grandchildren caregivers of patients with dementia. Research on technology use with people with dementia and caregivers, written by Rosenberg, Kottorp, and Nygard (2012), indicate that "older participants showed what appeared to be a self-chosen rejection/dissociation from technology that was new to them and which they judged as unnecessary" (p. 516). From this perspective, if older spousal caregivers decline to receive information through technology support groups because they are unfamiliar with the Internet or because they do not have computer access, technology support groups might be meaningless for these older caregivers. Future researchers may benefit from assessing the technological knowledge of participants prior to the intervention. Also, future researchers can provide technical support or training for participants who are unfamiliar with using the Internet.

Several limitations must be noted. This is a narrative review of technology-based social support groups, focusing only on peer-reviewed journals written in the English language. This review did not consider gray literature such as reports, dissertations, and conference articles. The gray literature might have valuable information to contribute to the effects of technology-based social support groups for dementia caregivers. Also, strategies to obtain reviewer consensus were not utilized during the literature search. As a result, researcher bias might have impacted the articles reviewed in this study.

Despite these limitations, this positive outcome has important future implications for caregivers. Many caregivers feel overwhelmed while caring for individuals with dementia. The use of technology, however, helps to overcome the lack of accessibility for this population. Reducing social isolation for these caregivers through support groups may be beneficial for both caregivers and care recipients. Direct service providers such as social workers, licensed mental health counselors, and psychologists may use these results to inform their practices. Furthermore, technology-based social support groups incur little cost to providers.

Overall, technology-based support group services have demonstrated a positive impact on caregivers with care burden. The technology-based social support groups enjoy a modest level of positive outcomes, appear to be low cost, and pose little risk of harmful effects while reducing care burden in caregivers. For example, the Marziali & Garcia (2011) study in the Internet-based intervention programs shows that caregivers receive various resources and improve ability of caregivers via technology-based group. Also, this intervention could build human social ties with other caregivers by providing a space to share their concerns, tips, and other information. This study indicates that implementing changes and improvements to this model may improve the lives of those experiencing care burden. Furthermore, technology services may reduce service cost

compared to face-to-face interventions. According to Finkel and colleagues (2007), caregivers' appointments to health care professionals are likely to decrease because of technology-based interventions; this benefits caregivers by reducing transportation difficulties for health appointments as well as educational sessions. Future research of technology-based support group services will more clearly identify the effects of this potentially promising intervention.

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